15¢

January 13, 1951

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

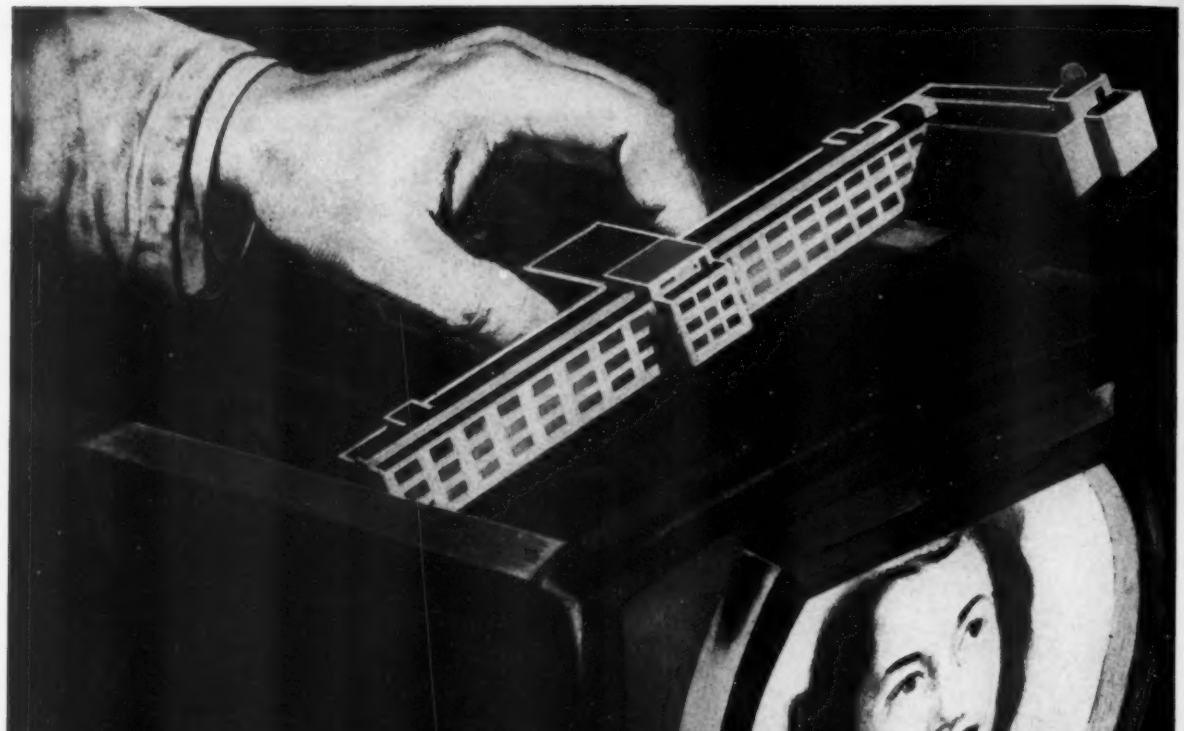
Eclipse in Gale

See Page 21

A SCIENCE SERVICE PUBLICATION

$5.50 A YEAR

VOL. 59 NO. 2 PAGES 17-32



Basic research at RCA Laboratories has led to most of today's all-electronic television advances.

At the heart of every television set!

Why show RCA Laboratories *inside* your television receiver? Because almost every advance leading to all-electronic TV was pioneered by the scientists and research men of this institution.

The supersensitive image orthicon television camera was brought to its present perfection at RCA Laboratories. The kinescope, in these laboratories, became the mass-produced electron tube on the face of which you see television pictures. New sound systems, better microphones—even the phosphors which light your TV screen—first reached practical perfection here.

Most important of all, the great bulk of these advances have been made available to the television industry. If you've ever seen a television picture, you've seen RCA Laboratories at work.

*

See the latest wonders of radio, television, and electronics at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, New York.

Through research from RCA Laboratories, today's RCA Victor television receivers are the finest example of electronic engineering.

RCA

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

ASTRONOMY

Planet Paths Calculated

Positions have been found for the five outer planets for the next hundred years. Calculations requiring 40 hours per week for 80 years by desk machine, done in few weeks.

➤ NAVIGATORS may feel secure in the announcement made at Haverford, Pa., that the positions of the five outer planets for the next hundred years have already been calculated.

G. M. Clemence of the U. S. Naval Observatory, Dr. Dirk Brouwer of Yale University Observatory and Dr. W. J. Eckert of the International Business Machines' Watson Scientific Computing laboratory stated that the paths of Jupiter, Saturn, Uranus, Neptune and Pluto have been traced out for over 400 years, from 1653 to 2060.

The actual positions of these planets have been calculated at 40-day intervals, they told those attending the meeting of the American Astronomical Society.

Navigators use the actual positions of Jupiter and Saturn to determine their location at sea or in the air. Through study of the motions of celestial bodies, astronomers hope to learn more about how the universe operates.

Basic theories of motion in all sciences depend upon the action of these planets in space. The same laws that govern the motions of planets also govern the motions of man-made devices such as airplanes and tractors, of natural phenomena such as weather and tides.

These five outer planets contain over 99% of the mass of all the planets. Thus their influence on comets and satellites is of the greatest importance.

The position of these planets had previously been calculated for only the next decade or so. Due to the cumulation of errors over the years some of the estimated positions were a few seconds of arc off, that is, 5,000 to 10,000 miles out of line.

The computations reported are by far the most extensive ever made. For the first time the actions of the planets on one another have been calculated each time the actual position of the planet was determined.

Each of the 3,600 separate calculations involved 800 multiplications of 14-digit numbers, 100 divisions, 1,200 additions and subtractions, and the recording of 3,200 digits.

These calculations would have occupied an operator with a desk machine, working 40 hours a week, about 80 years if he had made no mistakes. Actually, the large volume of calculation was done within a few weeks by the IBM Selective Sequence Electronic Calculator, made available without cost to the project by Thomas J. Watson, chairman of IBM's Board. This was the first electronic calculator built with "memory" enough to do the job, Dr. Eckert pointed out.

The computing machine gave the planet's coordinates directly, eliminating the need for further time-consuming figuring. It made all of the calculations, in duplicate, for a single 40-day step in less than three minutes.

At each step the machine automatically compared the two independent results, and in case of disagreement automatically repeated the calculation. The machine was found able to correct most of its mistakes on the second attempt; in case of disagreement on the second trial it stopped, indicating need for servicing.

About 15,000 observations of Jupiter and Saturn were used to determine the basic material fed into the electronic computer for the work. The paths were extended backward to 1653 because data from observations of an eclipse of Jupiter at that time are still of value.

For Uranus and Neptune fewer observations were available. This is because Uranus was not discovered until 1781 and Neptune not until 1846. There are, however, two precious pre-discovery observations of Neptune in 1795 when the planet was recorded as a ninth magnitude star. For Pluto the number of observations was comparatively small, this planet being found only two decades ago.

Science News Letter, January 13, 1951

CHEMISTRY

Clinical Chemists To Be Certified

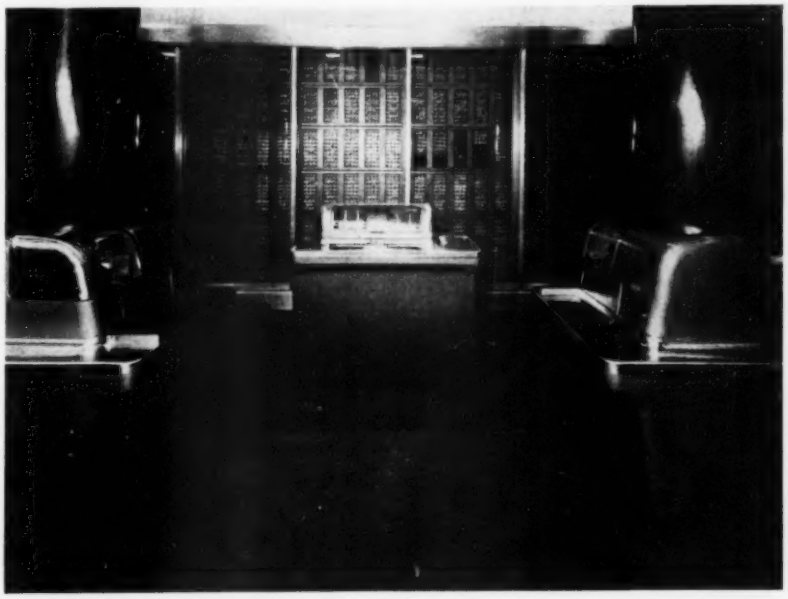
➤ PATIENTS and their doctors will benefit from the establishment of a new certifying board, the American Board of Clinical Chemistry, Inc.

Tests for detecting and diagnosing disease and development of new chemicals or new ways of using chemicals for treatment of disease are among the kinds of chemistry involved in this new specialty.

The new certifying board, like the American Board of Internal Medicine, the American Board of Surgery and other medical specialty boards, will establish standards and qualifications for persons wishing to practice the specialty.

Representatives of three leading organizations of chemists, the American Chemical Society, the American Institute of Chemists and the American Society of Biological Chemists, joined in establishing the new board. Officers are: president, Dr. Otto A. Bessey of the University of Illinois College of Medicine; vice-president, Dr. Donald D. Van Slyke of Brookhaven National Laboratory; secretary-treasurer, Dr. Jos. W. E. Harrisson, pharmaceutical chemist of Philadelphia.

Science News Letter, January 13, 1951



ROBOT BRAIN—With this electronic calculator, the positions of the five outer planets were calculated for the next hundred years.

GENERAL SCIENCE

Compromise Draft Plan

Provision being considered for college training of 18- or 19-year-olds after they have been put into uniform. Would meet objections to Conant, Hershey-Trytten plans.

➤ THE preparedness subcommittee of the Senate Armed Services Committee may well write into the new draft law it is considering a provision for college training of 18- or 19-year-olds after they have been put into uniform.

The members are considering several compromises of the two extreme points of view on how to handle the college training problem, Science Service has learned. Harvard President James B. Conant's plan for two years' service, without any deferments, for all 18-year-olds is one extreme, the "Hershey-Trytten" plan for deferment each year of up to 100,000 high school seniors showing the greatest aptitude for college training, is the other.

The subcommittee—headed by Senator Lyndon B. Johnson, D. Tex.,—will probably write into the new draft law a provision calling for putting all men who would otherwise be eligible to go to college into uniform and then either furloughing them or sending them in uniform to the college campuses.

Coupled with this idea are suggestions that a civilian board, rather than the Defense Department, decide what these soldier-students will study at college. Provision for such a board would either be written into the law or else the committee report on the new law would indicate that this was the intent of Congress.

Such a plan would get around the main objections to both the Conant and the Hershey-Trytten plans. Dr. Conant's plan, its detractors say, would cut off the continuous flow from the colleges of much-needed scientists, technicians and engineers. The Hershey-Trytten plan, its detractors say, would be politically impossible because the parents of boys who did not qualify for college deferment would object too strenuously.

More and more college educators are getting behind the compromise plan. And there are indications that this compromise is finding favor within the National Security Resources Board which formerly was partial to the Hershey-Trytten plan.

Science News Letter, January 13, 1951

ENGINEERING

Gas Turbine Locomotive Successful in Tests

➤ TEST running in regular freight service during the past 18 months of America's first gas-turbine electric locomotive proves the efficiency of this type of prime power in railroad work and 10 additional locomotives of this type are now under order.

The first gas-turbine locomotive, built by General Electric which will build the 10 under order, has been in use by Union Pacific railroad. It is this company that has ordered the additional railway tractors. Officials of the company state that, on a basis of results to date, the gas turbine electric locomotive looks promising as an addition to steam and diesel-electric power.

The new locomotive differs from the diesel-electric in that it uses a gas turbine engine instead of a diesel engine to generate electric energy for the driving power. Both use oil for fuel, but the gas turbine uses a cheaper oil.

Stationary gas turbine engines are already in use in various parts of the country and in other nations. A gas turbine is under test by the U. S. Navy to determine its suitability for marine use. One is also under test in a highway truck. The engine is a favorite in areas where water is scarce because it uses no water.

In principle, it is like the power plant used in jet-propelled airplanes. However, all of the hot gases resulting from combustion expand against vanes on a rotary shaft, resulting in high-speed rotation. In application this high speed is geared down to operate machinery or electrical generators.

Science News Letter, January 13, 1951

Question Box

ASTRONOMY

How long would it take a man with a desk machine to work out the paths of the five outer planets? p. 19.

How was it possible to observe a solar eclipse in the rain? p. 21.

CHEMISTRY

How is RDX explosive made? p. 24.

What unusual metal has been found in the dirt from smoke stacks? p. 25.

ENGINEERING

What were the results of tests of the new gas turbine locomotive? p. 20.

GENERAL SCIENCE

What is the compromise draft plan worked out by a Senate subcommittee? p. 20.

OCEANOGRAPHY

Where has a possible future source of food been found? p. 26.

PALEONTOLOGY

Who found the bones of an extinct sloth in his back yard? p. 24.

PUBLIC HEALTH

Why is Mexican canned meat now admitted to the United States? p. 30.

Why is there some danger of an invasion of influenza? p. 23.

RESOURCES

Where has a deposit of phosphorus been discovered? p. 23.

PHOTOGRAPHS: Cover, Naval Research Laboratory; p. 19, IBM; p. 21, Naval Research Laboratory; p. 23, Bell Telephone; p. 26, p. 27, Scripps Institution of Oceanography.

SCIENCE NEWS LETTER
VOL. 59 JANUARY 13, 1951 No. 2

43,800 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1930. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAte 2-4822.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Edwin G. Conklin, Princeton University; Karl Lark-Horovitz, Purdue University; Kirtley F. Mather, Harvard University. Nominated by the National Academy of Science; Harlow Shapley, Harvard College Observatory; R. A. Millikan, California Institute of Technology; L. A. Maynard, Cornell University. Nominated by the National Research Council: Ross G. Harrison, Yale University; Alexander Wetmore, Secretary, Smithsonian Institution; Rene J. Dubos, Rockefeller Institute for Medical Research. Nominated by the Journalistic Profession: A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. Nominated by the E. W. Scripps Estate: H. L. Smithton, E. W. Scripps Trust; Frank R. Ford, Evansville Press; Charles E. Scripps, Scripps Howard Newspapers.

Officers—President: Harlow Shapley; Vice President and chairman of Executive Committee: Alexander Wetmore; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, A. C. Monahan, Marjorie Van de Water, Martha G. Morrow, Ann Ewing, Wadsworth Likely. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins. Production: Priscilla Howe. In London: J. G. Feinberg.

ASTRONOMY

Eclipse Observed in Rain

Radar antennae used in place of optical instruments by expedition to Attu, Alaska, to measure frequencies in radio spectrum.

See Front Cover

➤ THE FIRST eclipse ever successfully observed by an expedition party soaked to the skin in a torrential downpour during a gale was reported in a series of three papers presented before members of the American Astronomical Society meeting at Strawbridge Observatory, Haverford, Pa.

The expedition to Attu, Alaska, to observe the solar eclipse last Sept. 12 was conceived and organized by Dr. John P. Hagen of the Naval Research Laboratory. It was designed for the express purpose of making measurements at a variety of frequencies in the radio spectrum. Radar antennae instead of telescopes and other optical instruments were used to study the solar eclipse. The whole setup is shown on this week's front cover.

Grote Reber of the National Bureau of Standards reported on the observations he and E. A. Beck, also of the Bureau, made at 65-centimeter wavelength with war-developed radar-like instruments.

Fred T. Haddock of the Naval Research Laboratory told of measurements of three- and ten-centimeter radiation he had made along with Cornell H. Mayer, Timothy P. McCullough, Donald R. White and Russell M. Sloanaker, all of NRL.

Almost a month was spent on the island installing equipment and making preparations. The small island of Attu, last and most westerly of the Aleutian chain, was chosen because it was the only place the eclipse path crossed American territory.

Dish-pan shaped "mirrors" of solid metal were used to capture outbursts from the sun. These antennae were set up on an old runway on Alexai Point, one of the few open flat places on the whole island. Two of these "mirrors" were six feet across and another 10 feet. A fourth antenna, two feet across, was also installed, but it proved inoperable because of the rain.

The sun is constantly radiating vast amounts of energy of one sort or another. Light and heat are those with which we are most familiar.

Through radio receivers you make use of radio waves about a quarter of a mile long. Radio hams communicate on waves about the length of a city lot. Experimental scientists, however, are using much shorter waves to explore the sun.

The sun explored by radio waves is slightly larger than that seen visually. Visually, we see energy originating in the sun's bright photosphere: with a radio we hear static coming from the sun's outer atmosphere or corona.

Preliminary results indicate that at the time of totality the sun is not totally eclipsed. A total of 5.6%, 22.5% and 25% of the sun's effective disk is left exposed at three-, 10- and 65-centimeter wavelengths, the radio experts reported.

Because the "radio" sun is larger than the moon, all eclipses viewed with radio apparatus will be annular rather than total —the moon just never can quite blot them all out.

A minimum of radio signals from the sun was observed not when the moon first visually covered the sun's disk, but a few minutes after totality. This delay in minimum was observed at all three wavelengths.

The delay was probably due, astronomers were told, to the fact that the sun's outer envelope or corona was not entirely symmetrical in intensity. It was made irregular by a group of sunspots near the east limb.

In the visible region sunspots appear much darker than the rest of the sun because they are radiating less energy. But at the centimeter wavelengths used, sunspots radiate great amounts of radio energy and thus are many times "brighter" than the rest of the sun. Thus extra energy radiated from these spots, upsetting the symmetry of the corona.

Science News Letter, January 13, 1951

ASTRONOMY

Electric Blanket Helps Sun Observation

➤ AN ELECTRIC blanket was used to keep a sun-observing instrument warm during flight in a B-29 high altitude flying laboratory.

Dr. Romuald Anthony of the U. S. Naval Ordnance Test Station, Inyokern, Calif., reported to the American Physical Society meeting in Los Angeles that the electric blanket kept the temperature of the instrument constant within two degrees Fahrenheit.

The instrument, a monochromator, focuses the sun's rays so that they can be observed at one wavelength only. The infrared region was studied during this flight.

Science News Letter, January 13, 1951

OBSERVING IN RAIN—A howling gale does not deter these observers of a solar eclipse. Here are shown Cornell H. Mayer and Timothy P. McCullough at the 10-centimeter radiometer. All loose gear and power supplies have been put in crates and covered with waterproofing material as protection against the weather. The large box behind reflector contains the principal part of the receiver. Smaller box on top contains a thermostatically controlled oven containing a "black body" for calibration.

POPULATION

Changes in Congress

Seats due to be reapportioned on the basis of 1950 census of population. California will gain seven seats. Missouri and New York lose.

➤ UNLESS Congress takes some action soon, the seats in the House of Representatives will be reapportioned among the states on the basis of the 1950 census of population.

The total number of seats will not change; it will remain 435, but each representative will in future represent 345,000 constituents instead of 300,000.

Altogether 14 seats will be gained and 14 lost by various states. California will be the biggest gainer, because of the tremendous jump in the population of that state. The coast state will have seven more seats in Congress than she had before.

California is now second only to New York in population, although in the last census, in 1940, it ranked fifth. The gain in population between 1940 and 1950 was 53.3%; from 1930 to 1940 it gained only 21.7%. Population growth in this one state was greater than for the entire Northeast Region.

Big New York is on the losing end in Congressional seats. That state loses two seats. The President's state, Missouri, and Oklahoma also lose two seats each. Pennsylvania loses three seats. Arkansas, Illinois, Kentucky, Mississippi and Tennessee lose one seat each.

Other gainers are Florida which will have two additional seats under the new apportionment and Maryland, Michigan, Texas, Virginia and Washington, each of which gain one seat.

According to the legal machinery set up in 1941, the President must transmit to the new Congress within the first week the report of the Bureau of the Census giving the distribution of the population as found in the 1950 census and the number of representatives to which each state is entitled. Congress must then act within 15 days either to change the law or otherwise. If they do not act, the Clerk issues a certificate to the governor of each state, telling him how many representatives his state may have. The governor then transmits this information to the state legislature and they take action for redistributing. In case they do not take such action, all representatives are elected at large.

Science News Letter, January 13, 1951

PHYSICS

Defense Gadget Racket

Most of the devices sold to protect you in case of atom bomb attack will do you no good and waste your money.

➤ THE CIVIL Defense rackets are just getting underway. Some people with no scruples see a gold mine in the fears of the American people about A-bomb attacks.

The danger from A-bombs is real. But many of the gadgets and materials that are being sold commercially will do you no good at all should an A-bomb attack come. Some gadgets are being sold in good faith, some private organizations are performing services which they think will be helpful—in most cases these moves are either ill-considered or hasty or both.

Just beginning to be advertised to the general public are several "decontaminating agents" which are alleged to get rid of radiation left around the house after an A-bomb attack. Some of these liquids are good for special purposes — for use in laboratories and industries handling radioactive materials all the time.

However, if an A-bomb bursts over your city and you live through it there is small likelihood that you will come in contact with any lingering radioactivity—because there will be very little. Scrubbing with soap and water will be adequate.

Many booklets, purporting to tell what to do if an A-bomb hits, strongly urge the purchase of a stock of ointment for burns. As a consequence the sale is going up. Don't buy any. Modern medical thinking is that the best thing to do for a burn is to cover it quickly with a sterile bandage or as clean a piece of cloth as possible. If you put ointment on, you limit the doctor in the kinds of treatment he can give to the burns.

Don't buy a Geiger counter, or any other kind of radiation detector. This fall the Atomic Energy Commission counted 180 different types of radiation detection instruments being manufactured. Much of this equipment is valuable for doing specific jobs—most of them in the laboratory. But don't fall for ads which urge you to buy a "pocket Geiger counter."

Should an A-bomb be dropped, there won't be much lingering radiation around. Trained Civil Defense teams will have the proper radiation detection instruments and will know how to evaluate what they indicate.

Some private contractors are offering to build bomb shelters in the backyards of the nation. If you are in a part of town spacious enough to have a back yard you are probably far enough away from the potential ground zero not to need a shelter. Many of the shelters offered are much more expensive than is necessary. Plans for a comparatively inexpensive home shelter will be shortly forthcoming from the Federal Civil Defense Administration.

There have been proposals for dog tags for civilians to provide for identification and information about blood groups. One veterans organization, in the words of an informed source, "got to President Truman over the bleeding bodies of practically all his advisers in these matters," and the President endorsed the idea. This organization is now distributing dog tags to civilians.

Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, has declared that mass blood typing is unnecessary. Victims of A-bomb attacks will be given plasma and plasma substitutes such as salt water drinks, which require no typing. Mass blood grouping would drain manpower needed for other jobs and perhaps exhaust the supply of typing serum.

Dog tags for identification purposes will probably be necessary. But, according to government officials, they should be standardized as to information and they should be distributed free by the Federal government, so that everybody has one.

One man proposes to manufacture for sale a "flash suit." The idea is that you step into this bag-like article and pull a draw string, just before an A-bomb attack. It will then protect you from flash burns. If you have time to step into the bag you will have time to reach more adequate shelter.

Science News Letter, January 13, 1951

PHARMACY

New Anti-Perspirant Is Less Irritating

➤ A NEW astringent designed especially to stop perspiration has been developed by Drs. John E. Christian and Glenn L. Jenkins of Purdue University School of Pharmacy. The astringent is aluminum methionate. It is better than other astringents in checking perspiration, much less irritating to the skin and has no harmful effect on clothing, the scientists report (JOURNAL, AMERICAN PHARMACEUTICAL ASSOCIATION, DEC.) Creams or pastes of it do not dry or harden.

Science News Letter, January 13, 1951

PUBLIC HEALTH

Influenza Threat

Disease epidemic may invade from either the east or the west. Health Officers alerted to possibility that disease may jump to U. S. through airplane travel.

➤ WE ARE threatened from the east and the west by influenza. The disease is now reported to be epidemic in England, Greenland, Hawaii, and South Pacific islands.

"There is no evidence of epidemic influenza in this country at this time, from any of our data," Dr. Carl C. Dauer of the National Office of Vital Statistics, U. S. Public Health Service, states. "The influenza reporting center at the National Institutes of Health has not had any laboratory reports indicating any influenza epidemic, either," he added.

In spite of the present healthy situation, there is always a good possibility of the disease spreading swiftly from one country to another. In these days of fast plane travel it can jump across oceans easily. So an outbreak seems likely though no one can predict when and where it will strike.

Following reports of the outbreaks on the Pacific Islands, health officers of the three west coast states were alerted by the U. S. Public Health Service. The California state health officer has replied that he is "very much on the alert" and presumably the others are also.

Science News Letter, January 13, 1951

RESOURCES

Phosphorus Lack Relieved

New mine and processing plant in Montana promise to make up shortage of chemical used for matches and in medicine and fertilizer.

➤ RELIEF from the shortage of phosphoric acid that has existed during the past ten years is promised with the opening of a new phosphate rock mine in Montana and a processing plant near Butte which will be ready for operation in about a year.

The ore to be mined runs about 27% phosphate which is not high enough in grade for making economically superphosphate for fertilizers. However, it can be successfully processed in an electric furnace into elemental phosphorus, and then eventually into phosphoric acid.

Hydroelectric power for the furnaces of this new plant will be brought over the Rockies from the government-owned Bonneville dam on the Columbia River near the Pacific coast in the Northwest, according to the U. S. Bureau of Mines. Some power will be obtained from the Montana Power Company. Mine and processing plant will be operated by Victor Chemical Works of Chicago.

Phosphorus is an essential for both animal and vegetable life. Man gets the phosphorus needed from compounds in the vegetables eaten. Plants get it from the soil, principally from phosphates. It is supplied to the soil very largely in superphosphates made from natural deposits of phosphate rock. The largest use for phosphorus itself is in making matches. Quantities are used, however, in medicine, rat poison, phosphorus compounds and in metallic alloys.

The manufacture of superphosphate for fertilizer is big business in the United States, and growing larger each year. The annual production of phosphate rock mining is around 10,000,000 tons. The superphosphate is a soluble calcium phosphate made from the insoluble rock by treatment with sulfuric acid. Approximately one-third of the sulfuric acid produced in the United States is used in the fertilizer industry.

Science News Letter, January 13, 1951

ENGINEERING-LANGUAGE

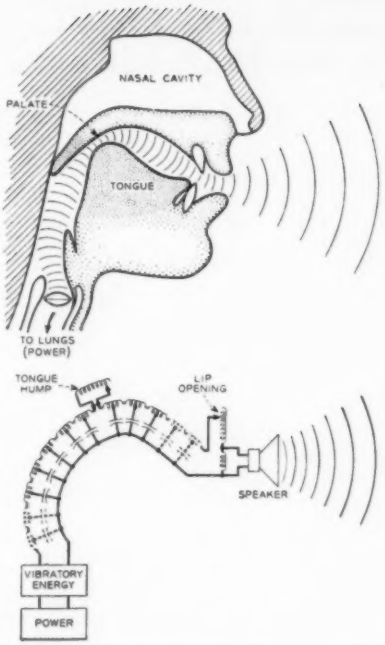
Machine That Speaks To Aid Science Study

➤ HUMAN-LIKE speech sounds that come from a machine are now being made. An energy source, electrical circuits and a loudspeaker in a certain combination do the trick. These roughly correspond to the lungs, the voice tract and the mouth.

The machine, now producing mainly vowel sounds, will be able to create other speech sounds as well, its designers, Dr. H. K. Dunn and L. O. Schott of the Bell Telephone Laboratories predict.

The near-human tones come from a system that mirrors electrically the mechanical system of the human speech organs. Unlike other machines that have been built to produce human-like sounds, this system creates speech, does not just ape it.

Other "voices" have built up speech sounds by duplication, that is, by analyzing the frequency of the vibrations that produce the sound, then making an exact copy of these vibrations.



SPEECH MACHINE—Showing position of vocal organs (above) in pronouncing "n" and equivalent adjustment of the electrical vocal tract (below).

This machine creates sounds by combining an energy source with an electrical system and a loudspeaker. It does so in a way specifically designed to imitate the human throat and mouth passage. This electrical vocal system includes the equivalent of the lip opening, the length of the speech tract and the tongue hump.

The function of each of these parts that make our speech sounds can be examined separately in the electrical counterpart. The machine will be used to investigate the similarities and differences among speech sounds and the how and why of these differences.

Sound patterns taken of real speech and of the created speech show striking similarities, Mr. Schott states. How the electrical voice should be built was based on measurements made from X-rays of the human voice tract. Between the energy source and the loudspeaker are a number of sections of series inductance and shunt capacitance.

Science News Letter, January 13, 1951

The California *condor* is a slow-breeding bird and there are only approximately 60 alive today.

September is the name of a new red *raspberry* whose principal crop matures in that month.

CHEMISTRY

Canadians Reveal How To Make RDX Explosive

➤ HOW to make RDX, the powerful explosive being used in bazookas in Korea, was announced by the Canadian National Research Council.

The process for cheap mass production of this once-secret chemical was developed during the last war by Canadian and U. S. scientists. RDX has figured in spy trials in both U. S. and Canada.

This devastating successor to TNT was first produced by the Germans during World War I. They could not find a way to mass produce it cheaply so its military significance was slight.

Now, however, it is in quantity production. In use, it is mixed with TNT. Chemically, RDX is cyclo-trimethylene-trinitramine, one of the host of chemicals that can be made from coal tar, natural gas or petroleum.

In the process described by the Canadians, RDX is made by mixing concentrated nitric acid and hexamine. RDX is far more violent than TNT, having at least 50% more power. Because it is very dangerous to handle, it is mixed with TNT and waxes.

Drs. C. A. Winkler, A. H. Vroom and M. Kirsch did the work on the reaction rates for making RDX while at McGill University during the period from 1942 to 1944.

Science News Letter, January 13, 1951

CHEMISTRY

Sulfur and Gas Saved From Petroleum Field

➤ SULFUR and natural gas, obtained as by-products in petroleum production in the new oil field in Worland, Wyo., are not wasted as formerly but are salvaged and are expected to yield a profit of $2,500,000 a year.

Natural gas produced with the crude oil in that area has a high hydrogen sulfide content which makes it extremely poisonous. The sulfide content is the highest yet found in any oil field gases. A similar gas at Elk Basin, Wyo., has an average content of hydrogen sulfide of 20%, but this Worland field has a 33% sulfide content.

Just completed between Worland and Baker, Mont., is a 13-inch pipe line approximately 340 miles long. Also constructed is a sulfur extraction plant, a gasoline plant and a compressor station. Funds for the construction, some $15,000,000, were provided by the Pure Oil Company, The Texas Gulf Sulphur Company and the Montana and Wyoming Pipe Line Company.

Today the gas is first put through the sulfur extraction and casinghead gasoline plants where an average of 300 tons of pure sulfur and 30,000 gallons of liquid products are obtained each day. Some 15,000,000 cubic feet of practically sulfur-free gas are obtained which is suitable for domestic uses. However, before distribution it is mixed with sweet gas from an upper gas formation.

At first the poisonous gas and recoverable natural gasoline in this field were conducted by pipe high in the air and burned. When hydrogen sulfide is burned it forms sulfur dioxide, a bleaching agent heavier than air. On damp days it settled to the ground in blankets of fog, doing much damage to crops. The new pipe line makes it possible to gather the production of the fields into a central plant large enough to warrant the cost of salvaging both sulfur and gas.

Science News Letter, January 13, 1951

ORNITHOLOGY

Wrong-Way Pigeons Spotted from Airplane

➤ HOMING pigeons can be fooled into taking the wrong direction, the American Association for the Advancement of Science was told by Dr. Harold B. Hitchcock, biologist at Middlebury, Vt., College.

He spied upon flocks of these birds from an airplane. When his homing pigeons were trained to find their way back to their loft by being taken always in the same direction, most of them flew off in that direction even when they were taken in an opposite direction.

Some of the birds seemed to be quicker than the rest to discover they had been fooled, but even the birds that seemed to know that they were not going straight home had great difficulty in making themselves break away from the flock. Sometimes it took a year or more of flying for the birds to sense the proper way home.

Science News Letter, January 13, 1951

PSYCHIATRY

Some People Wear Heart on the Skin

➤ SOME people wear their hearts on their skin. Persistent itching and scratching are signs of this, Dr. Phillip F. Durham Seitz of Indianapolis told members of the American Academy of Dermatology and Syphilology.

These people are considered by their associates to be unfriendly, "cold fish." Psychiatric study of 120 of such sufferers from itching and scratching showed that they are highly sensitive and easily hurt.

Their cold, composed air is a front. The scratching seems to serve a double function. It releases the muscular tension created by suppressed rage. It gratifies the need for love through cutaneous erotic pleasure.

When the patient gets the idea that he can express his anger to the doctor without being criticized for it, the first step has been taken on his way to psychiatric rehabilitation.

Science News Letter, January 13, 1951

IN SCIENCE

PALEONTOLOGY

Bones in Back Yard Are of Extinct Sloth

➤ IT WAS only a few bones that the youngster found in a New Jersey highway cut. But 14-year-old James Ruhle could be thankful that he did not live 100,000 years ago, when bears the size of elephants could have roamed his back yard.

The bones he found were those of a 15-foot-long bear-like mammal, the long-extinct North American ground sloth.

Dr. H. G. Richards of Philadelphia's Academy of Natural Sciences said it was the first evidence that the great sloth, distantly related to present-day South American sloths, once lived in what is now New Jersey. Similar bones have been found in a cave on the Schuylkill River in Pennsylvania, but never before in New Jersey.

The fossils were found by the boy in the new right-of-way of the New Jersey Turnpike near Moorestown, N. J. Their location showed that the great prehistoric creature lived in the Pleistocene era, when New Jersey's climate was warmer than it is today.

Science News Letter, January 13, 1951

MEDICINE

Dramamine for Nausea After Anesthetics

➤ THE NAUSEA and vomiting which are unpleasant and sometimes serious after-effects of anesthetics given for surgical operations can be prevented and relieved by dramamine, the modern motion sickness remedy and preventive.

A report, said to be the first, of successful use of the drug for this purpose is made by Drs. Carl J. Rudolph, D. Davis Park and Charles Hamilton of South Bend, Ind. (JOURNAL, AMERICAN MEDICAL ASSOCIATION Dec. 9).

First patient to whom these doctors gave the drug for this purpose was a man so sick the night of an operation that he was found lying on his abdomen, holding on to the bed. He said his head was going round so that he felt he must "hold on for dear life."

Within about one half-hour after dramamine he had entirely recovered.

The South Bend doctors now give a dose by mouth one half-hour before operation as preventive of nausea and vomiting. In cases in which patients have not been given this prophylactic dose and get sick after the operation, a suspension of the chemical in salt solution is given rectally.

Science News Letter, January 13, 1951

ENCE FIELDS

GENERAL SCIENCE

Detlev W. Bronk New A. A. A. S. President

➤ WITH the election to the presidency of the American Association for the Advancement of Science, Dr. Detlev W. Bronk becomes the American scientist holding the largest number of important scientific offices upon the American scientific scene.

Dr. Bronk, who will serve as president of this organization of 40,000 members during 1952, is already president of the National Academy of Sciences, vice chairman of the National Commission on UNESCO, member of the National Science Foundation, as well as filling many less important governmental and non-governmental offices. He is president of Johns Hopkins University in Baltimore.

Science News Letter, January 13, 1951

CHEMISTRY

Flue Dust Possible Source of Germanium

➤ THE RELATIVELY little known but increasingly important metal called germanium has been experimentally recovered from deposits in smoke stacks in England by the research laboratories of General Electric Company. Its growing importance is due to its use in electronics.

It has been known for 20 years that some of the coal found in England contains germanium. When coal is burned in industrial plants some two-thirds of the germanium in it is expelled as a germanium sulfide or oxide. These compounds form a deposit in the flues. It is from these deposits that the germanium is recovered.

Flue dusts from gas works may contain from 0.5% to 1% germanium. In the recovery process the compounds in which it exists are converted to germanium tetrachloride by treatment with hydrochloric acid. By further chemical processes, the tetrachloride is purified and the germanium obtained. Processes have now been developed which produce an economical yield. Supplies of high-purity germanium metal and germanium oxide are now available in England without imports.

It has been estimated that if only 100,000,000 tons of the coal used in England each year contains germanium in the proportions found in samples from various coal fields, about 2,000 tons could be recovered each year as a by-product of coal combustion.

While there are many important uses of germanium, one of its newest applications is due to its being a semi-conductor of electricity. It is now being used as a rectifier to convert alternating current to direct current. Some day it may replace some of the vacuum tubes for the purpose in radio equipment.

Science News Letter, January 13, 1951

VETERINARY MEDICINE

Sheep Are Dying Of Rabbit Fever

➤ SHEEP are dying on western ranges from a wildlife disease known as "rabbit fever."

A deadly germ producing an ailment technically called tularemia, is being carried to sheep by wood ticks which live on sagebrush, Drs. William L. Jellison and Glen M. Kohls of the U. S. Public Health Service's Rocky Mountain Spotted Fever Laboratory report. (JOURNAL, AMERICAN VETERINARY MEDICAL ASSOCIATION.)

The disease can kill or leave sheep without their woolen coats. One out of every ten sheep in one infected flock died. Others either lost their hair completely or produced wool of low quality.

Rabbit fever can be contracted by humans as well as by many forms of wildlife. Hunters often get it while dressing infected rabbits.

Science News Letter, January 13, 1951

MILITARY SCIENCE

Bombs Burst in Air with Sonic Proximity Fuse

➤ BOMBS dropped from airplanes on enemy targets will explode high enough in the air so that their death-dealing fragments will catch men in fox-holes and narrow trenches if equipped with sonic proximity fuses. For this device a patent was issued by the government among the 986 awards of the past week.

Bombs that detonate upon contact with the earth may do relatively little damage to men in holes and trenches. They scatter their debris over the surface doing damage to men and objects on the surface but only part of the fragments drop into the excavations. This sound-triggered bomb can be adjusted to explode at any predetermined height so that its fragments will fall into widely scattered fox-holes.

This proximity fuse is activated by sound waves of a particular frequency which are the results of waves sent out by equipment in the bomb and reflected back by the earth. The intensity of the reflected sound received by the detector will increase as the bomb gets nearer to the earth. The detector can be set to respond to an intensity which will be reached when the bomb has reached a desired altitude.

Patent 2,536,327 was issued on this fuse to William A. Tolson, Princeton, N. J. It has been assigned to Radio Corporation of America.

Science News Letter, January 13, 1951

PHYSIOLOGY

New Blood Factor May Aid A-Bomb Protection

➤ CLUES to the existence of a new body chemical, probably a hormone, that stimulates blood production have been discovered in the search for protection against atom bomb radiation.

The new substance, called a "factor", is apparently secreted by the spleen and to some extent by the appendix, liver and intestines. It was reported by Dr. Leon O. Jacobson of the University of Chicago at the meeting of the American Association for the Advancement of Science in Cleveland.

Earlier experiments by Dr. Jacobson and associates showed that mice, rats, guinea pigs and rabbits could withstand massive doses of X-rays if their spleens were shielded. Survival apparently depended on ability of the shielded spleen to stimulate blood formation in other tissues of the body. Damage to blood-forming organs is one characteristic effect of atom bomb radiations and X-rays.

Shielding the spleen and certain other organs helps survival, Dr. Jacobson's latest studies show, because of the new "factor" that stimulates blood formation. The factor can be produced by spleens even when they have been given sub-lethal doses of radiation. And the factor aids survival of animals even when given two days after exposure to radiation.

If the factor can be isolated, identified chemically and perhaps produced outside the body, it might prove valuable both to radiation victims and anemia patients.

Science News Letter, January 13, 1951

PHYSIOLOGY

Stomach Reacts To Stress Two Ways

➤ HUMAN STOMACHS follow two patterns of reaction to emotional and psychological stress, Dr. Stewart Wolf of the New York Hospital reported at the meeting of the American Medical Association in Cleveland, Ohio.

One is a "riddance" pattern, with digestion stopping and the person becoming nauseated and vomiting.

The other is the opposite pattern of excessive stomach function in which the person behaves as if he is about to be fed. This excessive stomach function has two serious dangers. One is a lowering of the pain response with the result that unsuspected damage may occur. The other is an increased fragility of the lining membrane of the stomach, paving the way for erosion and ulcer.

Dr. Wolf's report was based on direct observations of the activities inside the stomach and intestines of five patients who had been operated on for ulcers.

Science News Letter, January 13, 1951

OCEANOGRAPHY

Oceans' Strange Echo

Layer of "something" suspended deep in the seas may be a possible new source of food. Picked up as echo with sound gear, it is known as "deep scattering layer."

➤ IN THE oceans of the world there is an unknown thing, a mysterious moving mass of "something" suspended in the sea. For a hungry world, an entirely new source of food may be on the verge of discovery.

This is the hope of ocean scientists now studying a phenomenon which they refer to as the "deep scattering layer."

In Philadelphia recently, a paper by Dr. Lionel A. Walford, chief of fishery biology in the U. S. Fish and Wildlife Service, was read before the American Philosophical Society.

"This unknown thing, still unexploited, still unexplored, may prove to be an extravagantly large food resource," Dr. Walford wrote.

"The least result to be expected from research into the deep scattering layer would be an extension of human knowledge about the earth," he said. "The most valuable practical result might be undreamed of quantities of food."

During World War II, echo sounding instruments disclosed the presence of a layer of something between the bottom and the surface of the ocean.

It was found that when a sound was sent out from a ship, an echo returned not only from the bottom perhaps at thousands of fathoms, but also from something else at hundreds of fathoms. This false echo was sometimes so strong that navigators reported shoals where no shoals existed.

Schools of fish or whales often sent back echoes to destroyers hunting submarines with sonar. But this new echo seemed to occur everywhere in the ocean. During the day it was quite deep, up to half a mile down. At dusk it was found to move toward the surface and then disperse. Shortly before sunrise it would move again to the surface, then sink in a great layer as light flooded over the ocean's surface.

More Than One

Sometimes there was more than one layer, scientists of the University of California's Division of War Research reported in 1946. While working with new echo sounding gear in 1942 and 1943, they found two or three or even more scattering layers at certain places.

The California scientists said the echoes could be explained only by layers of material capable of reflecting sound waves. But at that time no one had ever heard of such layers.

In 1946 the National Geographic Society and the Woods Hole Oceanographic Institution of Massachusetts sent an expedition into the mid-Atlantic. Their scientists found the same mysterious echoes. In 1947 and every year thereafter, they found them again.

Scattering layer reports have come in from both Atlantic and Pacific Oceans, from the Gulf of Mexico, from the water approaches to Antarctica, from Hawaii to the Arctic.

"It now appears likely," Drs. J. B. Hersey and H. B. Moore of the Woods Hole Institution wrote, "that the main scattering layer is present universally in deep water throughout the area studied."

Cause Still Unknown

Other scientists agreed. They feel now that the deep scattering layer occurs everywhere in the oceans. But what causes this layer is still unknown.

They know that it must be some sort of biological life. Nothing inanimate, such as a layer of cold water, would consistently react to the amount of light present in the water.

Small creatures of the sea, called the "zooplankton," are sensitive to light. They rise and fall, following a vague boundary of perpetual twilight. So also do certain larger biological forms, such as the many-tentacled squid or giant eels.

The layer might be great schools of fish, living in regions of the sea where no one thought they could exist.

Many oceanographers, however, prefer the zooplankton theory. Some think the ocean's great "false bottom" is made up of countless tiny shrimp-like creatures, living together in great throngs.

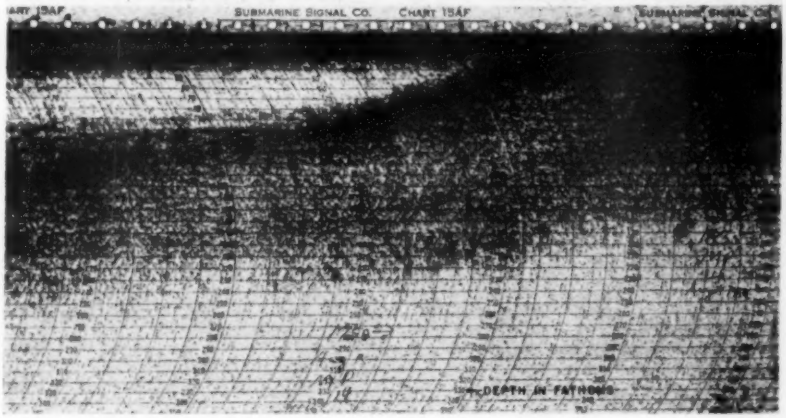
Euphausid Shrimp?

These are called euphausid shrimp. They are about an inch long, large enough to be caught by the echo-sounding signal. They react to light in the sea, coming up at night to feed on plant life in the waters near the surface.

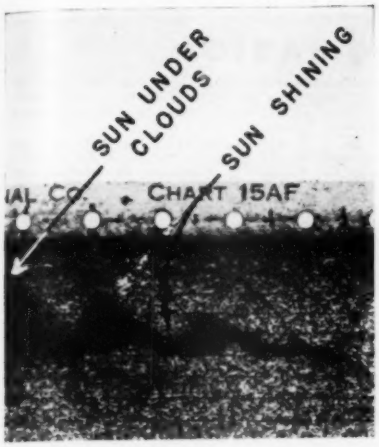
Larger fish of the sea feed on the zooplankton. Those which are not predators on other fish depend upon such small creatures for food. It has been suggested that the deep scattering layer consists not only of slow-moving zooplankton, but also of great numbers of fish feeding upon them.

Little is yet known of fish at these depths because it is next to impossible to catch them there. Nets cannot be towed fast enough at such deep settings to catch up with the fish.

The motorship "Horizon" of the Scripps Institution of Oceanography in California



LAYER—Echoes picked up by marine sound gear have revealed a layer of something which rises and falls, according to the amount of light at the surface of the ocean. The layer shows up here as a wide black streak on the graph, at between 600 and 1200 feet below the surface during the day. At sunset it rises rapidly toward the surface, where it disperses. At daybreak it once again sinks into the depths.



REACTION TO LIGHT—When a cloud moves over the sun, the deep scattering layer rises. Such reaction to light is characteristic of animal organisms called zooplankton.

and a Navy research vessel took sounding readings last summer over 29,000 miles of Pacific waterways between San Diego and the Marshall Islands.

They found that sometimes there are as many as five or six sound-scattering layers.

"The impression that we gained was that the upper layers of the ocean between the surface and 400 fathoms (about half a mile) teem with many kinds of organisms," Dr. Roger Revelle, acting director of the Scripps Institution, said.

"Sometimes these organisms are concentrated in layers," he said, "and at other times they are spread out through the entire upper part of the ocean."

If further research reveals that these organisms are fish or other creatures edible by man or livestock, it would force a complete revaluation of the amount of potential food available from the oceans.

The wealth of the seas is only dimly realized. In the deep scattering layer, as Dr. Walford of the Fish and Wildlife Service said, there may indeed be new, undreamed-of riches.

Science News Letter, January 13, 1951

MEDICINE

Forecasts Better Weapons Against Germ Warfare

➤ BETTER weapons with which to counter bacteriological warfare attacks against this country are foreseen by Dr. Norman H. Topping of the U. S. National Institutes of Health, Bethesda, Md.

These weapons, he said, will stem in part from work done in the Cornell Research Laboratory for Diseases of Dogs, dedicated at Ithaca, N. Y.

It does not matter, Dr. Topping stated, whether the laboratory includes the words "dog," "cattle" or "man" in its name. Answers to many of our civil defense problems against bacteriological warfare can come from such laboratories.

There is a large number of dangerous pathogens, he said, that any enemy could introduce into the air or into our water, milk or food supply. This warfare, he pointed out, could also be directed against livestock and agricultural crops.

Finding specific treatments for diseases caused by the smaller viruses, learning how to sterilize large masses of air and methods of mass immunization less cumbersome than injection of each individual are among the civil defense problems requiring intensified research, Dr. Topping said. The results would be of value to peace-time health and medical services as well as to civil defense.

Dr. Topping described the processes now known by which a virus survives. He cited the common cold virus as an example of the type that makes sure of its continuing life by attacking us again and again.

Other virus strains survive by "merely putting you into the hospital instead of the grave," thus insuring a supply of future hosts for its offspring. The virus of fever blisters or cold sores, *Herpes simplex*, is an example of one that has survived for centuries by causing minimum damage.

A third group of viruses depends upon the strategy of remaining quiet and unnoticed in our cells until they crop out again under suitable stress.

Science News Letter, January 13, 1951

AERONAUTICS

British Jet-Propelled Flying-Boat Tested

➤ A JET-PROPELLED fighter airplane of the flying-boat type is now under flight tests in England. It is believed to be the first aircraft of this type yet developed. If American aviation is working on a similar craft, the matter is still secret.

The advantage of this type of craft is that no landing field is necessary for its use. The flying-boat takes off and lands on water. The need for an attack plane that can operate from bays and inlets became evident during the war in the Pacific with Japan.

The need is again evident in the Korean situation. Landing on nearby water for refueling from supply tankers would save travel to distant airports.

This British water-based jet fighter, built by Saunders-Roe and known as the SR/A1, is the successor of two earlier models whose trials were brought to a standstill by accidents. It is powered by two straight-jet engines, the Beryl, built by Metropolitan Vickers. Each has a thrust of 4,000 pounds.

The two engines are built side by side with a single air intake in the bow. The jet outlets are aft of the wing trailing edge on either side of the fuselage. In speed, the SR/A1 is in the 600-miles-per-hour class.

Science News Letter, January 13, 1951

POPULATION

Cause of Population Rise

Tremendous increase not due to rising birth rate, but to falling death rate. Increase in soil productivity next step due.

➤ THE tremendous increase in the world's population in recent years is the result not of a rising birth rate, but of a falling death rate, Sir Paul Fildes, British microbiologist, told the Royal Society in his recent Leeuwenhoek Lecture.

The falling death rate has been brought about by the successful interference of medical bacteriologists with the disease germs which had previously tended to reduce the population. Bacteriologists during the past two decades have exerted an influence upon the economic and political world situation by making possible an excessive growth of human population, Sir Paul states.

Now it falls to the bacteriologists to attempt to restore the equilibrium between population and food by tackling the problem of increasing soil productivity through the study and greater utilization of soil bacteria, he urged.

The present effect of applied bacteriology is the latest chapter in the development of microbiology from the days of Leeuwenhoek who, in the 17th century, was the first person ever to see and describe bacteria under a microscope.

Sir Paul delivered the first of a new series of lectures before the Royal Society in honor of Leeuwenhoek.

Science News Letter, January 13, 1951

MEDICINE

Babies and Mothers Aided

➤ PREMATURE babies, patients needing skin grafts, and mothers facing the childbirth danger of toxemia are among those who may benefit through ACTH, it appears from reports at a conference in Chicago sponsored by Armour Laboratories, chief producer of the drug.

ACTH is a hormone from the pituitary gland in the head which stimulates the adrenal glands. It first gained fame as a companion to cortisone, adrenal gland hormone, in relieving the pain and crippling of arthritis. In the past year and a half both cortisone and ACTH have gained new laurels as potent remedies in many diseases.

Premature babies grow more vigorous, with stronger cries and voracious appetites, when stimulated by doses of ACTH, Drs. S. Levine, H. Barnett, C. Bierman and H. McNamara of Cornell University and New York Hospital reported.

After 42 unsuccessful attempts over a four and a half year period, skin grafts finally were made to take on a nine-year-old boy when ACTH was given, another group of scientists, Drs. Berry F. Edwards, Frank L. Engel, T. B. Schwartz, and Samuel P. Martin of Durham, N. C., reported.

Dramatically good results in two patients with severe toxemia of pregnancy were achieved by a combination of ACTH, cortisone and the synthetic female hormone, stilbestrol, Drs. W. Gaton, D. Reid and C. Roby of the Boston, Mass., Lying-In Hospital reported. The ACTH and cortisone were not effective without stilbestrol. Just why is not known.

A tie-up between ACTH, cortisone and vitamin A has been discovered in studies by Drs. C. Klopp, A. Danish and C. Tabor of George Washington University, Washington, D. C. Rats without adrenal glands to be stimulated by ACTH and to produce cortisone cannot maintain a good amount of vitamin A in their blood, even when their diet furnishes plenty of the vitamin.

Science News Letter, January 13, 1951

● RADIO

Saturday, January 20, 1951, 3:15-3:30 p. m., EST
"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. C. C. Dauer, medical advisor, National Office of Vital Statistics, U. S. Public Health Services, and Dr. Kenneth S. Landauer, director of Medical Case Services, National Foundation for Infantile Paralysis, will discuss "What is New in Infantile Paralysis."

AGRICULTURE

Fifth of U. S. Crust Was Blown to Where It Is

➤ GIANT dust storms are nothing new under the American sun. More than 20% of the U. S. crust is where it is because it was blown there, the American Association for the Advancement of Science was told.

A National Research Council committee of five geologists and five soil scientists made a progress report on their job of preparing an overall soil map of the United States, Canada and Alaska showing wind-laid deposits dating from glacial times.

The map, now nearly completed, shows that there is as much as 40 to 50 million acres of sandy soil, largely in Nebraska, Texas and Arizona, which were worked over and left the way they are by the winds.

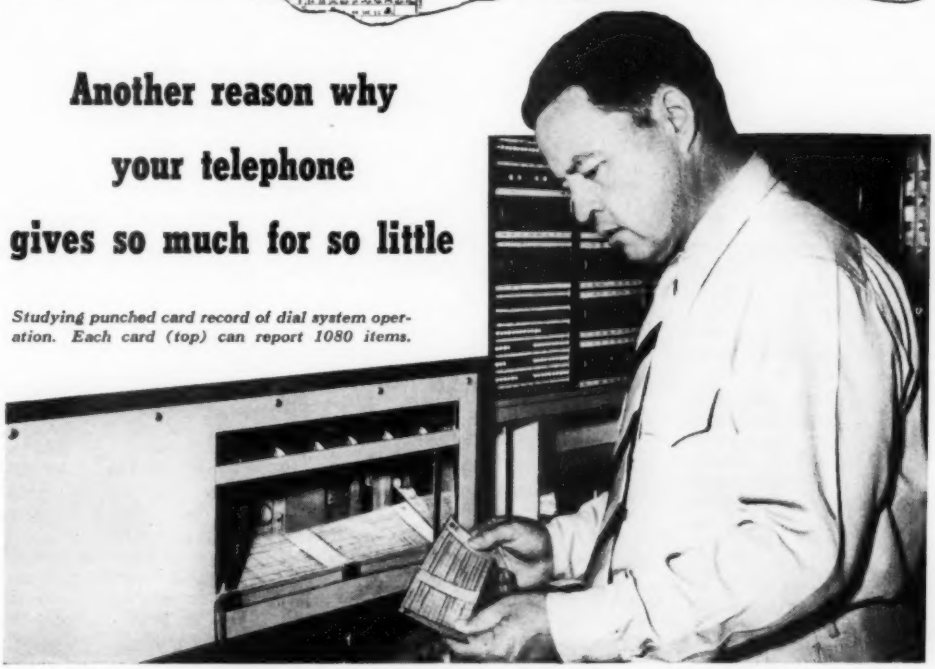
From the outwash and bulldozed leavings of giant glaciers, a yellowish-brown loam called loess was blown into the corn and wheat belts of the midwest, the cotton belt east of the Mississippi and south of Kentucky, the wheat-and-kafir-growing areas of the High Plains of Texas and Oklahoma.

The soils of approximately one-fifth of the United States have this loess as a major constituent, Dr. James Thorp of the U. S. Department of Agriculture said in making the committee's report.

There is a close relationship between the loess and glacial deposits of the central United States and regions of the Northwest, he said. On the other hand, probably much of the wind-laid land of the western Great Plains was blown from surface untouched by glaciers. It was mixed with silt picked up by winds screaming over floodplains of streams which rose in mountain glaciers.

Science News Letter, January 13, 1951

Another reason why your telephone gives so much for so little



Studying punched card record of dial system operation. Each card (top) can report 1080 items.

In a large, modern dial telephone office, 2,000,000 switch contacts await the orders of your dial—and 10,000 of them may be needed to clear a path for your voice when you make a single telephone call. Within this maze of signal paths, faults—though infrequent—must be detected and fixed before they can impair telephone service.

The latest system developed by Bell Telephone Laboratories automatically detects its own faults, detours calls around them without delay—then makes out a "written" report on what happened.

The fault may be a broken wire, or a high resistance caused by specks of dirt on switch contacts. In a second, the trouble recorder punches out a card, noting the circuits involved and the stage in the switching where the fault appeared.

Maintenance men examine the reports at intervals and learn what needs attention. Between times they go about their own duties in keeping service moving.

This is another example of how research at Bell Laboratories helps your telephone serve you at top efficiency—and low cost.

BELL TELEPHONE LABORATORIES

WORKING CONTINUALLY TO KEEP YOUR TELEPHONE SERVICE BIG IN VALUE AND LOW IN COST.

PALEONTOLOGY

NATURE RAMBLINGS

The Oldest Dinosaur

➤ ALL THINGS must have beginnings. Even the mighty dynasty of the dinosaurs, lumbering beasts that ruled the earth for more than three hundred million years, grew from other forms of life, lived their span and disappeared from the world forever.

The bones of the earliest dinosaur so far known date back to the geologic period known as the Triassic Age, roughly 400,000,000 years ago. The first such bones found in this country were dug up in Connecticut over a century ago—first a few fragments, then a complete skeleton with a skull. Scientists were able to build up a model of what the creature looked like in the flesh. They named it Anchisaurus.

It was not large, as dinosaurs go. An average specimen reached a length of about six feet. Its bones were light, indicating that it could probably move fairly rapidly. Its teeth showed that it lived on a meat diet. It was a hunter, a beast of prey.

There were no men on earth when the dinosaurs swam the seas and strode the hills. Man did not appear until well within the last million years, and there is no really definite evidence of his existence until the last hundred thousand. The day of the dinosaur ended long before, about 60,000,000 B. C. (Cavemen had enough to face, what with mastodons, cave bears and woolly rhinoceroses; it is just as well that they were spared casual allosauri and diplodocuses.)

The dinosaurs were huge reptiles. They were not lizards, although when early scientists got around to naming the dinosaur branch of the reptile family, they threw together the Greek words "deinos," meaning "terrible," and "sauros," which means lizard.

Even in its earliest form the dinosaur family showed characteristics that justified its name. There was a small head on a long neck, balanced by a long powerful tail at the other end of the body. The forelegs were diminished, but were offset by tremendous power and size in the rear pair, which in some of the later "saurians" became so highly developed that their owners were as much bipeds as are men or kangaroos.

There was the general tendency of the body to settle heavily back upon the pelvis, developing the potbellied figure we have come to think of as the real dinosaur shape. Anchisaurus, first of the dinosaurs, was a true granddaddy of his race.

Science News Letter, January 13, 1951

PUBLIC HEALTH

Mexican Canned Meat Now Allowed in U. S.

➤ THE UNITED STATES has opened its Rio Grande border to the importation of canned meat from Mexico, breaking an embargo which has stood as long as there has been a government meat inspection system.

Bureau of Animal Industry specialists said, however, that the ban against live animals or fresh meat, imposed in 1946 when foot-and-mouth disease hit Mexico, is still in effect.

Only meat from healthy animals, cooked, sterilized and canned, will be allowed across the border. The change in U. S. regulations, the Agriculture Department said, was made possible by the establishment of a Mexican meat inspection system which has met U. S. standards.

Prior to the detection of foot-and-mouth disease on Mexican cattle ranges, there was practically no meat-canning industry in Mexico and no inspection system. Except for one brief period, canned meat has never been allowed to cross into this country.

When the border was closed to live animals, they began to pile up in northern Mexico. To provide an outlet, a canning industry sprang up. With it came a rigorous new inspection system imposed by the Mexican Agriculture Ministry.

The United States has now recognized Mexican inspection of its canned meats as meeting American standards, and has changed its import regulations accordingly.

The change has nothing to do with the four-year-old fight by Mexican and American scientists to stamp out the foot-and-mouth plague below the border, a spokesman said.

Science News Letter, January 13, 1951

PHYSICS

Pocket Alarm Warns Of Radiation Danger

➤ LIKE AN ALARM watch that rings a warning, the Atomic Energy Commission has announced the invention of a pocket radiation alarm.

Designed to sound an alarm when exposure to radioactivity or other harmful radiation accumulates to too high an amount, the new device was patented by R. J. S. Brown of Laundale, Calif., and H. G. Weiss of Waltham, Mass. (U. S. Patent 2,531,106.) It can be set for the desired amount and it can be carried anywhere on the person.

The AEC will grant non-exclusive, royalty-free licenses.

Science News Letter, January 13, 1951

BACTERIOLOGY

Food-Spoiling Spores Have Ten Lives

➤ TINY bacterial spores which cost the world great sums each year in spoiled food have to be hit from as many as 10 different directions before they are destroyed, a bacteriologist at the University of Illinois has discovered.

The knowledge that such spores or "seeds" have more lives than the proverbial cat is a new clue in science's battle to prevent food spoilage in car or jar.

Illinois professor of bacteriology H. O. Halvorson used higher mathematics to uncover the multiple lives of spores. Looking for the answer to bacterial resistance to high temperatures, he guessed that multiple killing might be necessary—that each spore might have more than one vulnerable spot which must be destroyed for the spore to die completely.

He computed the mathematical odds of life or death for spores if such multiple killing were the answer. Then he subjected spores of a food-spoiling bacteria known as "flat sour" to high temperatures. He took samples at intervals to check how many spores remained alive.

The curve he got matched the mathematical probability curve for 10 "lives" or vulnerable spots.

Science News Letter, January 13, 1951

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWSLETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publication direct from issuing organizations.

COMPARATIVE STUDIES ON THE JAWS OF MANDIBULATE ARTHROPODS—R. E. Snodgrass—*Smithsonian Institution*, Publ. 4018, 85 p., illus., paper, 70 cents.

DEMOCRACY IN A WORLD OF TENSIONS: A Symposium prepared by UNESCO—Richard McKeon, Ed.—*University of Chicago Press*, 540 p., $4.50. Essays selected from materials collected in response to the questionnaire prepared by UNESCO to find out what democracy means to scholars in different parts of the world.

FAMILIES OF DICOTYLEDONS—Alfred Gundersen—*Chronica Botanica*, 237 p., illus., $4.50. Classification of these flowering plants.

FUNDAMENTALS OF QUANTUM MECHANICS—Enrico Persico—*Prentice-Hall*, 484 p., illus., $8.00. Fundamental laws and principles by the director of the Physics Dept., Laval University, Quebec. Translated by Georges M. Temmer.

THE HELL-BOMB — William L. Laurence — *Knopf*, 198 p., $2.75. A popular account of the principles of the hydrogen bomb and the author's own conclusions.

LAPLACE TRANSFORMATION: Theory and Engineering Applications—William Tyrrell Thomson—*Prentice-Hall*, 230 p., illus., $5.00. An advanced mathematical text from the University of Wisconsin.

LEARNING THEORY AND PERSONALITY DYNAMICS: Selected Papers—O. Hobart Mowrer—*Ronald*, 776 p., illus., $7.50. The author takes the position that learned drives, like primary drives, can motivate and reinforce behavior and that learning is of two types—problem solving and conditioning. Freudian formulations are rejected or revised on the basis of experimental evidence.

MAN'S VENTURE IN CULTURE: Some Inventions Underlying Civilization in Illinois Today—Thorne Deuel—*Illinois State Museum*, 40 p., illus., paper, 15 cents, free to residents of Illinois upon request to the Museum, Springfield, Ill. Key inventions—from stone axe to electric power—behind man's development, as illustrated by the Diorama Series in the Illinois State Museum.

MANUAL OF ANALYTICAL METHODS FOR THE DETERMINATION OF URANIUM AND THORIUM IN THEIR ORES—U. S. Atomic Energy Commission—*Gov't. Printing Office*, 55 p., illus., paper, 20 cents.

MATHEMATICAL ENGINEERING ANALYSIS—Rufus Oldenburger—*Macmillan*, 426 p., illus., $6.00. The author aids the research engineer to express physical situations in the form of equivalent mathematical relations.

A METHOD OF CODING CHEMICALS FOR CORRELATION AND CLASSIFICATION — Chemical-Biological Coordination Center — *National Research Council*, 98 p., illus., paper, $1.50. A code devised primarily to permit the use of punched cards in the correlation of chemical structure with biological action.

MOVIES FOR TV—John H. Battison—*Macmillan*, 376 p., illus., $4.25. A guide to the technique of using and adapting movies for television.

ORGANIC REAGENTS FOR ORGANIC ANALYSIS—Staff of Hopkin and Williams Research Laboratory—*Chemical*, 263 p., 2nd ed., illus., $5.00. Revised and enlarged.

THE PRACTICAL BOOK OF FOOD SHOPPING—Helen Stone Hovey and Kay Reynolds—*Lippincott*, 290 p., $3.45. Many practical buying hints which will aid both in improving meals and saving on the budget.

PRACTICAL MICROSCOPY—L. C. Martin and B. K. Johnson—*Chemical*, 2nd ed., 124 p., illus., $2.50. To aid those interested in the technique of modern microscopy. Chapters on ultra-violet microscopy and the electron microscope are included.

REPORT OF THE COMMITTEE ON A TREATISE ON MARINE ECOLOGY AND PALEOECOLOGY 1949-1950—Harry S. Ladd, Chairman—*National Research Council*, 59 p., illus., paper, $1.00.

SOIL EXPLORATION AND MAPPING—Highway Research Board—*National Research Council*, 121 p., illus., paper, $1.50. Contains information regarding the status of both geological and agricultural soil mapping in the United States.

STEREOCHEMISTRY: A Textbook of General Organic Chemistry—E. de Barry Barnett—*Pitman*, 169 p., illus., $4.00. Dealing with the arrangement of atoms in the molecule.

A WATER POLICY FOR THE AMERICAN PEOPLE, Vol. I: General Report—President's Water Resources Policy Commission—*Gov't. Printing Office*, 445 p., illus., paper, $3.75; Summary of Recommendations, 18 p., illus., paper, 15 cents. Volume I contains the Commission's full 1950 report on developments, objectives and planning. (See SNL, Jan. 6).

WHITE MINERAL OIL AND PETROLATUM—Erich Meyer—*Chemical*, 135 p., illus., $4.75. A handbook on chemical and physical characteristics.

Science News Letter, January 13, 1951

ICHTHYOLOGY

Penicillin Stops Epidemics in Aquaria

➤ ADD to the conquests of penicillin the stopping of epidemics among amphibians kept in aquaria.

Dr. H. K. King of the University of Liverpool reports (NATURE, Dec. 16), that upon two occasions he has stopped an epidemic infection by adding penicillin to the water of the open tank in his laboratory. In one case edible frogs were saved and in another the creatures were axolotls, tailed amphibians best known in Mexico.

Two days before the axolotls died in considerable numbers an unusual number of visitors came to his laboratory, presumably infecting the laboratory specimens.

Science News Letter, January 13, 1951

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N ST., Washington 6, D. C. and ask for Gadget Bulletin 552. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

⚙ *CIGARETTE CUTTER for persons who want a short smoke, has two small flat pieces of metal, one of which slides over the other in side grooves. One piece has a hole through which a cigarette is inserted; the other a V-shaped cutting edge.*

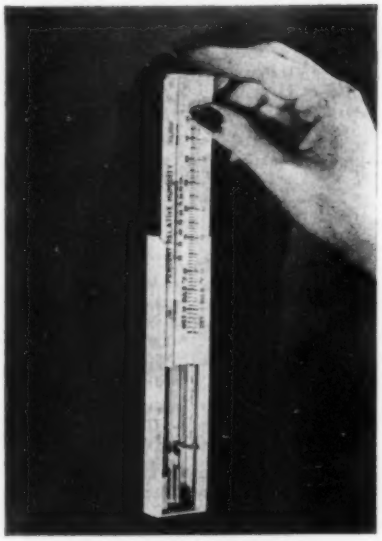
Science News Letter, January 13, 1951

⚙ *HEATED STEERING WHEEL for automobiles is a newly-patented device in which half the plastic wheel itself and two spokes carry an embedded electric resistance wire. Electricity from car's battery and generator is used to warm the wheel to the touch.*

Science News Letter, January 13, 1951

⚙ *POTATO RACK, for use in baking, is an aluminum alloy shelf that will fit in any oven. It holds potatoes upward by projecting V-shaped prongs. These prongs also make a vent to permit excess steam to escape.*

Science News Letter, January 13, 1951



⚙ *HUMIDITY INDICATOR, pocket-size, has two thermometers within a plastic case as shown in the picture. One is a wet-bulb thermometer with a wick easily moistened. After wetting and fanning the instrument through the air, both temperature and relative humidity can be read from the slide-rule cover.*

Science News Letter, January 13, 1951

⚙ *MECHANICAL BUS for the youngster, made of chip-proof plastics, has front and rear adjustable bumpers which provide automatic direction-control. When the bus hits a table leg or baseboard, direction is reversed and it starts backward across the floor to meet another obstacle.*

Science News Letter, January 13, 1951

⚙ *TELEVISION EYEGLASSES are made of a new absorptive type of optical glass designed to reduce glare and minimize eye fatigue. It is claimed that they permit all-evening viewing without discomfort and provide softer pictures even when sets are tuned up bright.*

Science News Letter, January 13, 1951

⚙ *WRITING GUIDE for the blind, recently patented, is a board with side pieces to hold the writing paper and a movable cross piece. This cross piece has a slot extending throughout its length to confine writing to the paper below it. Pins hold the crossarm in position.*

Science News Letter, January 13, 1951

Do You Know?

The only dogs with wholly blue or black tongues and lips are the Chinese *Chows.*

Italy is improving its *corn* crop by adapting American hybrid corn to local conditions.

Mountain *beaver* of the Pacific coast area is structurally somewhere between the porcupine and the marmot.

Durable wrapping paper is being made which has a layer of *glass* fibers between two sheets of kraft paper.

Briquettes of small-grade coal are to be made at mines at Spitsbergen in the Arctic north of Norway to use in heating in Norway itself.

Aluminum posts for street lights are found satisfactory; they have the necessary strength, are light to handle and present no corrosion problem.

"Balanced pruning" of *grape vines* means a fixed relationship between the number of fruiting buds left on the vine and the weight of wood removed.

If a glaring *headlight* dazzles an automobile driver for three seconds and the driver requires seven seconds to recover, he will travel 440 feet without proper vision if his speed is 40 miles per hour.